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ABSTRACT

An investigation of the principal nonverbal factors elicited by four major correlational studies that examined the relationship between process and product variables in American elementary school classrooms yields several discernible trends, but for the most part contributes mainly to establishing a set of recommendations to guide future research in the field. Use of classroom space, student movement about the classroom, and assorted proxemic and kinesic teacher behaviors are the foci of the study. A bibliography is appended. (LH)

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Nonverbal Behaviour and Student Achievement in the Elementary Classroom

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Abstract

The classroom nonverbal behaviour of both students and teachers has received increased recognition during the past 15 years and is now regarded as an important though often overlooked phenomenon. The purpose of this paper was to examine the principal nonverbal factors elicited by four major correlational studies which investigated the relationship between process and product variables in American elementary schools. The nonverbal factors compared across the studies included use of classroom space, student movement about the class, and assorted proxemic and kinesic teacher behaviours. Although the data yielded several trends which deserve closer attention in subsequent investigations of classroom processes, the studies' main contribution was to provide a set of recommendations to guide future research on nonverbal behaviours in the classroom.

Nonverbal Behaviour and Student Achievement in the Elementary Classroom

Several recent reviews of the nonverbal communication literature (e.g., Galloway, 1976; Smith, 1979; Thompson, 1973) have emphasized both the prevalence of nonverbal behaviours in teaching and the significance of nonverbal phenomena for gaining an understanding of classroom processes. These and other authors have argued that both students and teachers are communicating continuously whether they are verbalizing or not and that nonverbal behaviours are critical to the conduct and climate of the regular classroom situation. During the past 15 years, parallel sentiments have provoked an increasing amount of research on various categories of the nonverbal domain (cf., Bremme & Erickson, 1977; Koneya, 1976; Sommer, 1969; Weinstein, 1977; Wolfgang, 1977).

For classification purposes, the area of nonverbal communication (here used interchangeably with the term "nonverbal behaviour" for functional considerations) may be divided into seven overlapping categories (cf., Knapp, 1978): (a) environmental factors, composed primarily of classroom design features and including such topics as windowless classrooms, use of available classroom space, and effects on behaviour of rearranging classroom

furniture; (b) proxemics, defined as the use and perception of one's social and personal space; this category includes student seating patterns and levels of pupil participation in open or traditional classrooms, effects of a low space-to-pupil ratio, and teacher placement within the classroom; (c) kinesics (popularly known as "body language"), the study of body motions and posture and of facial and eye behaviour; this area includes quantity of teacher gestures, variables related to teacher warmth and enthusiasm, and teacher gaze; (d) haptics, the quantity and quality of touching behaviour which occurs in the classroom; (e) physical characteristics, consisting of physique, height, and skin colour; (f) paralanguage, which includes voice volume, pitch, tempo and intensity, silent pauses, intruding sounds, and speech errors; and (g) artifacts, involving the differential use of clothes and beauty aids. This system of categories will be used to classify the assorted research findings outlined below.

Although factors within several of the nonverbal communication categories have been examined in the classroom setting either singly or in some combination (e.g., Hesler, 1972; Norton & Dobson, 1976; Pratt, 1974; Victoria, 1970), no study has made a deliberate attempt

to relate the many continuous classroom nonverbal behaviours with measures of subsequent student achievement. The particular research model in question, usually referred to as the process-product paradigm, is currently the predominant one in educational research (cf., Doyle, 1978; Dunkin & Biddle, 1974; Gage, Note 1) and has served to guide classroom-based inquiry which is increasingly ethnographic (Fienberg, 1977) or naturalistic (Guba, 1978) in nature, rather than psychostatistical or experimental.

In the early 1970s, four large American investigations adopted the process-product paradigm in order to determine the classroom processes which might be related to subsequent student achievement in reading and mathematics at the elementary school level. The studies were based at the University of Texas (e.g., Brophy & Evertson, Note 2, Note 3), at the Stanford Research Institute, now SRI International, in Menlo Park, California (Stallings & Kaskowitz, Note 4), at the University of Florida (Soar, Note 5), and at the Educational Testing Service in Princeton, New Jersey (e.g., McDonald & Elias, 1976, Note 6). The investigations produced vast amounts of mainly correlational data which subsequently prompted a number of related publications (e.g., Brophy & Evertson, 1976; Stallings, 1975). More germane to the aims of the present discussion, however, was Gage's (Note 1, p. 106)

perception that these and other studies had provided the necessary quantity and quality of correlational data to allow formal classroom experimentation to proceed in earnest, at least at the elementary grades when reading and mathematics were the subject matters involved.

A previously-expressed reservation concerning Gage's position (Smith, in press) provided the stimulus for the current paper. It was not at all clear whether the necessary descriptive or correlational data were in fact represented in the studies insofar as classroom nonverbal behaviours were concerned. Accordingly, the main goal of this presentation was to examine results of the four massive projects in order to determine whether adequate data had been collected which related classroom nonverbal behaviours with subsequent levels of student achievement. If the nonverbal domain was found to be adequately represented in these studies, then Gage's call for experimental work in the classroom would be substantiated. However, if the type and amount of data involving nonverbal behaviours was found to be deficient, then classroom experimental research would be premature until additional descriptive or ethnographic inquiries had been conducted.

Results

Findings reported by the major investigations and two subsidiary studies (Sandoval, 1976; Evertson & Brophy,

Note 7) were examined for both nonverbal content and implications for future research. However, no attempt was made to conduct meta-analyses of the assorted data sets (cf., Glass, 1978) because the results were often too tenuous and the nature of the target variables too dissimilar from study to study to make such a treatment reasonable. The findings considered most central to the present discussion were classified according to the categories of nonverbal communication outlined previously.

Environmental Factors

This category consists of classroom design and related environmental features such as window and desk placements, seating, lighting, and use of classroom space and materials. For example, Soar (Note 5) examined the influence on achievement of formal versus informal classroom organization where the latter type of organization was characterized by pupil freedom, by substantial pupil involvement with materials and other class members, and by having the children's artwork on display. Soar found that informal classroom organization correlated negatively with achievement for children in nonentering (into Follow Through classrooms) grade one and grade two, but not for children in kindergarten and entering grade one.

One classroom environmental factor often mentioned

in the nonverbal communication literature is room attractiveness, a variable which includes qualities such as wall colour, lighting, and neatness. In their examination of this factor, Brophy and Evertson (Note 2) presented linear relationships which indicated a positive relationship in year one of their study between room attractiveness and later student achievement while, during the second year, some negative relationships existed for pupils from high socioeconomic (i.e., high SES) backgrounds. However, in their more comprehensive report containing nonlinear data, Brophy and Evertson (Note 3) reported that there was little firm evidence to relate room attractiveness to achievement and that any relationships which did exist could not be interpreted. The latter publication also reported mixed results concerning achievement in both uncrowded and "busy", cluttered classrooms. Similar lack of support for this factor emerged from the teachers' self-report data (Brophy & Evertson, Note 3) where no effects were observed between arranging attractive bulletin boards and student achievement. However, as the authors pointed out, one problem with the self-report data concerned the way in which each teacher defined the word "attractive".

An additional high-inference measure examined by Brophy and Evertson concerned rules regarding physical

movement about the classroom: (a) the pupil must always get permission to leave his or her seat, and (b) the pupil may go quietly to specified places without permission at any time. Although the relevant data was generally confusing and uninterpretable, the authors suggested that high SES pupils were better able than low SES pupils to handle the freedom and responsibility attached to leaving one's seat without permission. Conflicting results also emerged from the self-report data (Brophy & Evertson, Note 3) over whether the teacher should discourage pupils from moving around the room freely.

Stallings and Kaskowitz (Note 4) observed that, when the child was able to select his or her own seating and work groups, achievement seemed to be related somewhat positively with independence, cooperation, and initiative and somewhat negatively with task persistence. In addition, these investigators found that child selection of seating and work groups correlated negatively with mathematics achievement at the third grade level while no effect was detected for first grade classes.

Brophy and Evertson (Note 2, Note 3) and Stallings and Kaskowitz (Note 4) examined the variables "free time materials available" and "materials observed in use" for their effects on achievement. The Texas study indicated

that, because these factors were changing too much within each classroom to provide meaningful data, no firm conclusions could be drawn concerning the usefulness or significance of these activities and resources. However, Brophy and Evertson felt that having free time materials in use was more important than simply making them available to the pupils. Similarly, Stallings and Kaskowitz found no relationships between puzzles, games, and related academic activities and student achievement. Nevertheless, the latter investigation found that use of audiovisual equipment correlated somewhat negatively with task persistence and somewhat positively with cooperation and initiative. Achievement seemed to be linked negatively with instructional materials used in the classroom.

Stallings and Kaskowitz (Note 4) discovered a negative relationship between accepting responsibility for failure and an instructional variable. Children who did not accept the responsibility for their own failure tended to come from classrooms where a child was allowed to select his own seating and groups and which provided a wide variety of materials and activities. These investigators also found that:

> In general, a low absence rate, high independence, and high scores on Raven's Coloured Progressive Matrices, a test of non-verbal perceptual problem-

> solving, tended to be associated with the more flexible classroom where a wide variety of materials are used, many different activities occur, and children are allowed to select their own groups and seating part of the time. (p. 343)

Finally, Stallings and Kaskowitz concluded that children from more flexible classrooms take responsibility for their own success but not for their failure, while children from the more highly-structured classrooms take responsibility for their own failure but attribute success to their teachers' competence or other forces outside themselves.

No other major environmental factors were examined in the studies although effects of several minor factors were found to be either insignificant or confusing.

Proxemics

This category of nonverbal communication is defined by how one uses and perceives his or her social and personal space and includes variables such as preferred seating patterns, levels of participation in various work groupings, and teacher placement within the classroom. The findings will be reviewed in order of: (a) student use of space and (b) teacher use of space and time.

The first relevant student movement variable was examined by Brophy and Evertson (Note 2, Note 3) and

concerned distractions, that is, what pupils do when they are not working. The data was confusing and difficult to interpret, but the authors saw several trends as indicating that high SES pupils used the washrooms appropriately and that some intermediate optimal value existed for these pupils in terms of the number of times they left their seats to get supplies for free time activities. This particular class of variables provided one of the clearest instances where simple frequency counts of target behaviours led to uninterpretable results through neglect of the context in which each behaviour occurred.

The second relevant variable examined by Brophy and Evertson concerned the pupils being allowed to work in cooperative groups. For low SES children, a negative relationship seemed to exist between work in cooperative groups and subsequent achievement. However, the same factors displayed an inverted-U relationship for high SES pupils. These findings suggested that, for the latter group of children, work in cooperative groups was satisfactory if not overdone and again underscored the ability of this group to act responsibly when given a moderate amount of freedom.

With respect to teachers' use of space and time, the first variable to be examined here concerns teacher movement to pupil seats to check work instead of remaining

at the desk. Brophy and Evertson (Note 2, Note 3) found that this variable related negatively with achievement for high SES pupils. Otherwise, no relationship was apparent. The authors interpreted this result to mean that high SES pupils preferred being given responsibility for their activities instead of being closely supervised. Also, in the teachers' self-report data, Brophy and Evertson obtained some weak evidence to show that less successful teachers of high SES pupils stayed at their desks for longer periods of time.

The final reference to teacher movement to be mentioned here was reported by Sandoval (1976), who found that teacher movement correlated positively with pupil attitude towards reading in second grade classes. Teachers high on this variable usually moved around the room interacting with instructional materials and helping students act out stories.

Brophy and Evertson (Note 2) used low-inference measures to explore the influence of nonverbal control contacts on pupil achievement. This variable was defined as moving close to the disruptive student or touching him or her or making facial expressions or gestures. Although the analysis of linear relationships unexpectedly showed generally negative trends, the subsequent report on nonlinear relationships (Brophy & Evertson,

Note 3) indicated that this variable was unimportant and did not appear to be a successful discipline method for this group of children.

Brophy and Evertson (Note 3) examined an additional management item by investigating the number of times that the teacher asked the whole class to line up. According to the self-report data, a negative relationship existed between the number of times the class lined up and subsequent pupil achievement. The authors suggested that poor classroom management procedures such as this one resulted in a waste of class time.

The ways in which teachers use time also emerged in the Brophy and Evertson studies. One variable in question, teacher waits patiently if student does not respond promptly, resulted in slight negative relationships with achievement. On the other hand, Brophy and Evertson (Note 3) found that, according to the relationship between teacher interview and student gain scores, teachers who kept up the class pace instead of waiting for correct answers produced enhanced achievement in low SES pupils.

As implied by most of the factors considered so far, proxemics is usually defined in terms of the use of social and personal space but this usage occurs in the time dimension as well. One variable involving use of time was the final one mentioned above. A second one was

defined approximately as "smooth efficient transitions with little time wasted in class" (Brophy & Evertson, Note 2, Note 3). Results of the nonlinear analysis suggested a positive relationship with achievement for low SES pupils and no relationship for high SES pupils. The authors interpreted the data to mean that low SES students should be kept engaged in classroom activities.

Finally, two variables which Brophy and Evertson found to be unimportant were: (a) "teacher usually speaks to individuals rather than to the whole class", and (b) "teacher uses well established routines to minimize interruptions; the room runs automatically". Apparently these factors were of little consequence at the second and third grade levels.

Kinesics

In this category of nonverbal behaviours, the focus of attention is on body motion, use of face and eyes, gestures and postures, and the rather ephemeral qualities of warmth and enthusiasm. In the variables to be examined below, the relatively more discrete factors will be examined before the more global ones.

In his investigation, Soar (Note 5) examined the influence of a variety of process measures on the achievement of kindergarten and grades one and two children. Although nonverbal concerns were distributed throughout the factors

investigated by Soar, one of the more specific was the comparison between teachers' use of "gentle control" and their use of "nonverbal gentle control" where the latter was defined as placing hands on the student or touching the student for reasons of control. Soar found no relationship between these two variables and concluded that some teachers used their hands to exercise classroom control, while others used words, smiles, and other facial feedback. However, both factors were effective in achieving control in the elementary classroom.

One of the nonverbal elements often thought to be important in the communication process is that of bending close to the pupil during an interaction (cf., Johnson & Pancrazio, 1973; Kleinfeld, 1973; Knapp, 1971). However, Brophy and Evertson (Note 2, Note 3) found that only one of 10 possible relationships was positive and conveyed the impression that this variable was not an important one for children in the lower grades.

Several other factors were more global in nature and tended to reflect some general teacher characteristics. The first of these, examined by Brophy and Evertson, was that of the teacher appearing confident and self-assured. No relationships with achievement were observed, a finding which led the authors to conclude that this variable was unimportant at the grades one and two level.

Brophy and Evertson also considered the variable "showmanship", where the teacher was defined as being melodramatic, expressive, gushy, and emotive. Both linear and nonlinear analyses seemed to suggest a slight positive relationship with achievement for low SES pupils, while the nonlinear results produced a negative trend for high SES children. Hence, the variable did not seem to be an important one. In addition, the Brophy and Evertson nonlinear analysis (Note 3) revealed an inverted-U shaped relationship between achievement and a factor called "typical affectionness level" for both low SES and high SES children. However, effective teachers of low SES children tended to be more affectionate towards their pupils than effective teachers of high SES pupils were towards theirs.

One of the kinesic variables often regarded as critical for teachers to possess is that of enthusiasm. In their reports, Brophy and Evertson did not find strong support for this position. Nonlinear analysis of the data produced a generally positive relationship between enthusiasm and achievement for low SES pupils, but generally mixed results for high SES pupils. In the light of some supplementary results, the authors suggested that effective teachers of low SES pupils were warm, encouraging, positive, student-oriented and enthusiastic, and that

positive teacher affect was relatively unimportant in high SES classes. The latter proposal could be taken to mean that high SES children were already so highly motivated to achieve that teacher enthusiasm about instructional material was not critical. In addition, however, highly enthusiastic teachers in high SES schools seemed to have a less desirable mix of qualities than those in low SES schools, since the former group seemed to manifest an overdone gushiness instead of genuine enthusiasm.

An additional qualification concerning enthusiasm emerged from Sandoval's (1976) videotaped protocols, where it was found that teacher enthusiasm correlated negatively with attitudes toward mathematics at the second grade level. These results were explained in "that overly enthusiastic second grade teachers somehow communicate to children that a lot of energy and effort is necessary to be successful in mathematics, a message which is somehow discouraging to children" (p. 76).

Haptics

The only study which seemed to investigate the systematic use of touch in the classroom was that of Sandoval (1976). The results indicated that "positive physical contact" (defined as giving a physical display of affection to the child following good work or behaviour) was effective with grade two children, since the factor

correlated significantly with reading attitudes and mathematics achievement at this grade level. The author concluded that younger children seemed to be encouraged to perform by teachers who were warm and physical but that physical contact did not seem to have much of an influence on older children.

The final three nonverbal communication categories described previously, physical characteristics, paralanguage, and artifacts, were not considered by any of the four studies.

Discussion

Given the massive quantities of data collected by the four groups of investigators, the results linking teacher and student classroom nonverbal behaviours with subsequent measures of student achievement were meagre indeed. However, in fairness to the various authors, the paucity of firm evidence was recognized by them as well. It was apparent that the data which they collected and analyzed provided less in the way of definitive statements and more in terms of general conclusions and suggestions for future research. The latter areas will be outlined below.

General Conclusions

Brophy and Evertson (Note 3) reported that their study failed to find any strong, replicated relationships

between teacher behaviour and student learning. They proposed that teaching involves the orchestrating of a large number of variables instead of mastering a short list of basic teaching techniques which would apply in all situations. In addition, McDonald and Elias (1976) expressed reservations about the standard use of correlations to relate teaching variables with pupil outcomes because of the critical lack of information contained within such measures.

In the same vein, McDonald and Elias (Note 6, p. 48) stated that they found no single skill or teaching performance which was equally or comparably effective in both grades two and five or in both subjects of reading and mathematics. They later concluded (p. 55) that differences in patterns of teaching performance accounted for differences in pupil learning and that "the data suggest two hypotheses: first, a pattern of teaching performances is more likely to be related to learning than is a single performance; second, effective teaching patterns differ by subject matter and by grade level" (p. 55).

Brophy and Evertson (Note 3) reported that, in contrast to the usual presumption about certain teachers being more effective in certain subjects than in others, levels of teacher success tended to hold across subject areas in the elementary classroom. That is, the effective

teacher of mathematics was also most likely to be the effective teacher of reading.

Brophy and Evertson supported previous authors (e.g., Jackson, 1974; McKeachie, 1976; Overholt & Stallings, 1976; Stubbs & Delamont, 1976) when they stated that their own findings based on data from naturalistic classroom settings frequently conflicted with results from laboratory-based studies. This most critical point should encourage and hasten the current tendency of educational researchers to move into the classroom to collect their assorted project data.

Several points of particular relevance to the study of classroom nonverbal behaviour emerged from the studies examined here. First, Brophy and Evertson (Note 2, p. 20) indicated that, for pupils in lower grades and especially in low SES classes, instruction through verbal interaction is less important and less effective than instruction through other means. These authors felt that because children at the lower grade levels have not reached the stage of concrete operational thinking, their learning is heavily action-oriented and their ability to benefit from purely verbal instructions is still quite limited. Second, in his study of kindergarten to grade two classes, Soar (Note 5, p. 92) reported that considerable amounts of classroom activity occurred at higher intellectual levels

without being represented in verbal interaction. This observation stemmed primarily from Soar's efforts to code data from audiotaped recordings.

A conclusion of some significance for educational researchers attempting to train teachers in particular skills was enunciated by McDonald and Elias (1976):

> Attitudes related to aspirations are positively related to teaching performance factors that are also positively associated with aptitude factors. Such relations suggest that attitudes and aptitudes are predictors of internal states correlated with behavior in the form of teaching performances. Given the general stability of such factors as aptitudes and attitudes, it seems likely that combinations of them and their associated performances are descriptors of consistent teaching styles. (p. 940)

The authors continued by stating that, if such were the case, then the important question was whether the styles were modifiable. McDonald and Elias saw clearly that some teaching performances were ineffective and that changing those performances was especially critical if internal states were involved. Because current evidence suggests that attitudes and aptitudes are harder to modify than more surface factors, the major concern is

whether ineffective performances can in fact be modified. Apparently, simply isolating a desired skill to be learned may not be sufficient to promote effective classroom behaviour on the part of the teacher.

Several important observations concerning affective measures were derived from the studies. For example, Brophy and Evertson (Note 3, p. 28) indicated that some of the success in achieving superior academic scores may come at the expense of affective gains, particularly in high SES classes. Accordingly, Brophy and Evertson (Note 2) felt that student learning gains should not be used as the sole criterion of teaching effectiveness. They felt that affective development was most important, especially in those schools where pupils were already achieving at high levels. These authors expressed the need to develop valid and reliable measures of student affective outcomes, notably for younger children. A second major study (Stallings & Kaskowitz, Note 4) found its affective measures to be neither valid nor reliable. In future, nonverbal indices may play a central role in resolving issues concerning the affective domain.

Suggestions for Future Research

Further to their reservations outlined previously concerning single teaching skills or performances, McDonald and Elias (Note 6) concluded:

> There are no single teaching-performance variables correlating so significantly with children's learning that they should be considered critical for effective teaching. This result should influence the direction of future research. In the past most research on teaching was the study of the zero-order correlations of a teaching act or event or activity with a measure of learning. It is well-known that this mode of analysis has yielded meager results. This study suggests that it is different patterns and structures of teaching acts that influence changes in learning rather than single, omni-effective teaching performances. (pp. 48-49)

As a further order of complexity to classroom research, McDonald and Elias (1976) suggested that another domain of analysis that should be considered seriously is the organization of sequences of learning tasks. In addition, these authors felt that future research should analyze the character of the processes being learned at any given point in time, since there seemed to be considerable variation in the nature of the processes to be acquired in reading and mathematics at the elementary school level.

One of the major areas of current concern in classroom

nonverbal research involves the ecology and context of the classroom (cf., Doyle, 1977), a topic mentioned frequently by the studies reviewed here (cf., McDonald & Elias, 1976; Brophy & Evertson, Note 2, Note 3; Evertson & Brophy, Note 7). For example, McDonald and Elias (1976) stated that:

> In order to understand the phenomena at a deeper level, the categories of teaching performances need to be organized by context, materials used and interactions within context. Contexts determine performances, materials determine interactions, and until the interactions among these various components of the observable behavior are established, we will not have a meaningful picture of what is meant by a teaching performance. (p. 953)

Brophy and Evertson (Note 3) felt that future research should control context by: (a) concentrating on specific subject matter areas; (b) concentrating on certain kinds of classroom events (e.g., small group vs. large group work, discussions vs. lectures vs. drills, or monitoring seatwork); and (c) taking into account sequential changes in the teachers' goals during these latter interactions. These authors suggested that establishing teacher-student links in more clearly specified situations involving more clearly specified types of teachers and students would

further clarify the situation. Also, while research projects usually consider teachers as variables to be manipulated, Brophy and Evertson suggested that teachers be included as consultants in the research process. Each of these proposals should help to take contextual influences into account.

Evertson and Brophy (Note 7) observed that, in the event teachers are used to provide essential data for research projects, researchers should ask open-ended interview questions which allow the teachers to say what they are trying to do, how they are trying to do it, and why are they doing it the way they are doing it.

Brophy and Evertson (Note 3) suggested that correlational data linking various classroom processes with subsequent achievement was confusing because, in addition to lack of concern for contextual differences, no data on individual students was obtained. In order to help rectify this situation, Brophy and Evertson suggested making the individual pupil the unit of analysis and then trying to determine optimal teaching for individual pupils as well as for whole class groups.

In addition to commenting on deficiencies in the contextual data, several investigators felt that the observational data being collected was simply inadequate because of the tendency to record frequency counts only.

For example, Brophy and Evertson (Note 3) stated that "variables such as praise or criticism of students and use of student ideas need to be coded for the appropriateness and effectiveness of the teacher's use of these techniques, not merely for frequency with which the teacher uses them" (p. 165). The same basic point was made at greater length by Sandoval (1976):

> The fact that a particular event is infrequently observed does not mean that the event is not an important behavior. One teacher may only give one child positive physical contact during a lesson, whereas another teacher may give several children a pat or an embrace. Nevertheless, one significant contact between teacher and child in one class may have been far more important than numerous physical contacts between another teacher and his/her pupils. Moreover, some forms of feedback or events of instruction are only appropriate at very few times. In many cases, the vary [sic] fact itself that a teacher exhibits a particular behavior is more important than the number of times he/she performs that behavior. The frequency data, then, must be used with great care in designing future experimental research. (p. 57)

Sandoval (1976) also indicated that one problem seen in his own study was the large number of behaviours that observers were asked to attend to. He suggested that in future researchers should consider only a few categories of behaviours at one time and that six or seven classifications might yield more reliable results. Sandoval's observation seems pertinent if observers are looking for discrete and specific behaviours instead of behaviour sequences.

The use of videotapes in classroom research encountered a mixed reception. Sandoval (1976) felt that the advantages of observation through videotapes outweighed the disadvantages when certain teacher behaviours were being looked at in detail. However, McDonald and Elias (1976) felt that videotapes might make the class less naturalistic and concluded that live observations provided better data sets than videotaped recordings, even if there were some problems with live observers. Overall, however, it appeared that videotaped protocols could serve valuable purposes as long as their shortcomings were recognized. For nonverbal research purposes, the use of videotapes seems indispensable.

In view of the current trend toward collecting teacher or student self-report data, Evertson and Brophy (Note 7) offered a caution. They discovered a response bias

operating on the teacher self-report data and a resulting inconsistency between self-reports and observed classroom behaviour. These authors felt that, in order to understand the precursors of student outcome measures, behavioural evidence should be collected instead of self-report data.

Concluding Comments

The main aim of this presentation was to examine from the nonverbal perspective Gage's (Note 1) contention that sufficient correlational data on classroom processes had been collected to allow formal experimentation to proceed. As indicated by results derived from the four major investigations, Gage's position received less than firm support. Even for the particular grade levels and subjects involved, findings were too often tenuous at best. Accordingly, conducting standard experimental research projects in the classroom setting would seem to be premature at this time, at least when nonverbal behaviours are involved.

However, several key directions for future research emerged from the studies. First among these was a concern for the classroom context in which pupil and teacher behaviours occurred (cf., McDonald & Elias, 1976; Brophy & Evertson, Note 3). It was apparent that the investigations examined here paid little heed to contextual

influences, a common failing of educational research undertaken so far.

Second, it seemed that patterns of teaching performance, not discrete skills, constituted the critical elements of teacher effectiveness in the classroom (cf., McDonald & Elias, Note 6). In this regard, the task for future classroom studies is to determine what those behaviour patterns are and how they influence pupil outcomes.

Third, and not unrelated to the previous two matters, it was apparent that simple frequency data and the accompanying correlational analyses were inadequate to capture the essence of continuous classroom processes (cf., Sandoval, 1976; Brophy & Evertson, Note 3). Alternative ways of viewing and subsequently analyzing in-class behaviours are obviously required if the process-product paradigm is to yield the dividends expected of it.

One possible step toward resolving all three of these problem areas has been outlined in some of the counselling literature, for example, where similar difficulties of analyzing human interactions have appeared (e.g., Gottman, Markman, & Notarius, 1977). In their study, Gottman et al. (1977) outlined four methodological problems in previous research related to the resolution of marital conflict: (a) the hidden assumption that the nature of the

experimental task is unimportant; (b) the way in which interaction data are coded; (c) the descriptive utility of the codes; and (d) the manner in which the data have been analyzed. These investigators went on to analyze marital interaction by examining content, affect, and context differences among married couples. In addition, Gottman et al. used sequential data analysis procedures employing Markov chains (cf., Gottman & Notarius, 1978) to analyze the functions of messages.

With some modification of the Gottman et al. (1977) procedures to fit the classroom situation, it should be possible to respond to the key issues outlined above and even to make possible the experimental studies envisaged by Gage once the necessary preliminary data has been collected via descriptive or ethnographic investigations.

A final suggestion of relevance to the study of classroom nonverbal behaviours is to eliminate the nonverbal classification system used here, especially during the data-collection phase. This step would be consistent with those outlined above in terms of trying to understand both the entire classroom context and the constellation of factors contributing to the teaching-learning situation.

In summary, the major contributions of the large studies examined here lay not with the massive amounts of

data which were collected but rather with the directions outlined to guide future research endeavours in the classroom setting. It is anticipated that the study of nonverbal behaviours will be an essential part of those investigations.

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